

## **Saxifraga, Sect. Porophyllum Gaudin in the USSR**

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ABSTRACT. 26 species of Saxifraga, sect. Porophyllum occur in the USSR: one in the Eastern (Ukrainian) Carpathians, 22 in the Caucasus, and three in the mountains of Middle Asia. S. biebersteinii Sipl., nom. nov., and S. caspica Sipl., nom. nov., are proposed for the invalid names S. laevis Bleb. and S. meyeri Manden., respectively. Two new species, Saxifraga polytrichoides Sipl. and S. unifoveolata Sipl. are proposed, and two new combinations, S. grisea Sipl. and S. sommierii (Engl. & Irmsch.) Sipl. The relationships of some critical species are also discussed.

Section Porophyllum of the genus Saxifraga contains perennial caespitose plants with woody basal caudicles clothed with coriaceous marcescent leaves that possess calcium-secretory pores along the margins. The flowers are pendent or erect on adenotrichous flowering stalks. The ovary is deeply inferior.

The present work is based primarily on materials in the herbarium of the Botanical Institute of the Academy of Sciences of the USSR in Leningrad (LE) and, to a lesser extent, on materials of the herbaria of Moscow and Kiev. The English-language part of this work is a translation from the original Russian of the draft manuscript. This must be noted for the following reason: since the species of the Porophyllum section occur in the USSR exclusively within the limits of southern Soviet colonies, I had to work with the collection-documenting texts in eleven languages, of which I knew only six, and had to find a translator for the texts written in five other languages. Therefore, when quoting the labels of the specimens studied, I am quoting them in the original language--if this language employs the Roman alphabet--or in the English translation in all instances when the alphabet of the language on the labels is not Roman, e.g. when these labels were written in Cyrillic or in such exotic alphabets as Georgian and Armenian. This, incidentally, accounts for the inevitable variations in transliterating proper names and names of geographical locations. The text of the label is an important source of information; in these cases it has to be quoted in full, since Soviet botany has almost completely discarded the time-honored tradition of indicating the specimen number on the label, a practice that results in decreased precision of presentation when describing different specimens investigated.

In the citations, the altitudes above sea level are quoted in the units that are indicated on the labels of the respective specimens. In transliterating proper names I generally followed the rules of American bibliography except when the collector in

question is a well-known botanist and there already exists a tradition of transliterating his name into Roman characters (as a rule, the transliteration in such instances is German). I follow the Russian geographical tradition, calling "Middle Asia" that part of Central Asia inside the USSR border and south of the line Caspian Sea-Aral Sea-Balkhash Lake-Tarbagatay Range.

Key to the USSR species of *Saxifraga* Sect. *Porophyllum*

1. Flowering stalks single-flowered, sometimes almost absent and then the flowers submerged among the upper leaves of the caudicles..... (2)
- Flowering stalks with apical inflorescences, sometimes few-flowered..... (5)
2. Leaves of caudicles with 3-5 calcium-secreting pores on margins; petals purple or red..... (3)
- Leaves of caudicles with one calcium-secreting pore near the apex; petals white or yellow..... (4)
3. Plant light or gray-blue and coralloid due to the divaricate, imbricate-leaved caudicles; flowering stems with glandular trichomes; petals scarlet. 22. *S. columnaris*.
- Plant green, cushion-shaped due to shortened, approximate, densely-foliated caudicles; flowering stems glabrous; petals purple. 23. *S. dinnikii*.
4. Caudicles imbricate-foliolate; leaves thickened at apex and curved outward; peduncles and pedicels hardly developed; flowers sessile with white petals. Plants of Middle Asia (Western Pamir). 26. *S. pulvinaria*.
- Caudicles with whorled leaves; leaves narrowed toward the apex and not curved; flowers on well-developed pedicels; petals yellow. Plants of Caucasus (Balkaria). 25. *S. carinata*.
5. Plants of Carpathians or Middle Asia.....(6)
- Plants of Caucasus.....(8)
6. Peduncles up to 15 cm tall with 5-16-flowered inflorescence; caudicle leaves with 19-25 pores; petals greenish-yellow, 5-nerved. Plants of the Carpathians. 1. *S. luteo-viridis*.
- Peduncles up to 5 cm tall; caudicle leaves with 3-5 pores; petals white, 3-nerved. Plants of Middle Asia.....(7)
7. Caudicle leaves 3-4 mm long and 1-1.5 mm broad, thickened at apex, rounded or obtuse, concave; sepals with glandular trichomes, ciliate. 2. *S. albertii*.
- Caudicle leaves 10-15 mm long and 2.5-3 mm broad, acuminate, slightly keeled below; sepals glabrous. 3. *S. vvedenskyi*.

8. Flower stalks glabrous.....(9)  
 -- Flower stalks pilose or with glandular trichomes.....(13)
9. Caudicles with whorled leaves; leaves slightly channeled, with smooth margins that bend downward.....(10)  
 -- Caudicles with alternate leaves, though sometimes mixed with whorled leaves; leaves not channeled, the margins plane, ciliate or aristulate-ciliate along lower half or third.....(11)
10. Caudicle leaves 9-20 mm long, divaricate; sepals reflexed at maturity, with 3 simple nerves. 8. S. subverticillata.  
 -- Caudicle leaves 5-10 mm long, mostly appressed to the stem; sepals with 3 branched nerves, appressed to the capsule at maturity. 9. S. colchica.
11. Caudicle leaves with 5-7 easily-visible pores, broader at base gradually narrowed toward the apex, the upper 1/3 of margins smooth. 19. S. kuznezowiana.  
 -- Caudicle leaves with 1-3 obscure pores on some leaves, broader at the middle and abruptly narrowed toward the apex, the upper 1/3 of margins ciliate or aristulate-ciliate.....(12)
12. Caudicle leaves 4-5 mm long and ca. 1.5 mm broad; sepals sub-orbicular, with smooth margins. 11. S. sosnowskyi.  
 -- Caudicle leaves 5-10 mm long and about 2 mm broad; sepals elliptical, subacute or acute, with ciliate-toothed margins. 10. S. caucasica.
13. Caudicle leaves tapering, the upper 1/3 of margins smooth.(14)  
 -- Caudicle leaves oblong or lanceolate, the upper 1/3 with ciliate or aristulate margins.....(18)
14. Petals 3-5-nerved, broader than the sepals.....(15)  
 -- Petals 1-nerved, narrower than the sepals.....(17)
15. Petals always with some red, varying from reddish-yellow to reddish-orange. 24. S. X oettingenii.  
 -- Petals always without red, varying from bright yellow to bright golden.....(16)
16. Caudicles with whorled leaves; sepals with glandular trichomes; petals 5-nerved. 20. S. charadzeae.  
 -- Caudicles with alternate leaves; sepals glabrous; petals 3-nerved. 17. S. juniperifolia.
17. Caudicles with widely-spaced leaves; leaves dull gray-green, curved outward, with 5-7 pores. 18. S. grisea.  
 -- Caudicles with imbricate leaves; leaves shining, bright-green, not curved, with 1-3 pores. 21. S. ruprechtiana.

18. Flower stalk covered with long, white hairs. 12. S. desoulavyi.  
 -- Flower stalk covered with short, brick-red hairs.....(19)
19. Petals 3-5-nerved, broader than the sepals.....(20)  
 -- Petals 1-nerved, narrower than the sepals.....(23)
20. Caudicles with widely-spaced leaves and basal rosettes; leaves about 20 mm long, shining, not curved, the veins readily visible; petals 5-nerved. 4. S. pseudolaervis.  
 -- Caudicles with imbricate leaves, columnar, without basal rosette; leaves 2-10 mm long, dull, hollow, with inconspicuous veins; petals 3-5-nerved.....(21)
21. Leaves 2-3 mm long, with pectinate-ciliate margins; petals 3-nerved, equalling the sepals. 7. S. polytrichoides.  
 -- Leaves 4-10 mm long, with cartilaginous-toothed margins, sometimes becoming ciliate toward the base; petals 3-5-nerved, twice as long as the sepals.....(22)
22. Leaves up to 7 mm long, oblong-spatulate, with small apical teeth; petals clawless, 5-nerved. 6. S. caspica.  
 -- Leaves up to 10 mm long, oblong-elliptical, flat, without apical teeth; petals clawed, 3-nerved. 5. S. biebersteinii.
23. Caudicle leaves not curved, with 1-5 pores; petals twice as long as the sepals.....(24)  
 -- Caudicle leaves somewhat curved, always with 3-5 pores; petals equalling or slightly exceeding the sepals.....(25)
24. All leaves with 1 apical pore; caudicles 1-3 cm long with imbricate leaves, appearing columnar. 15. S. unifoveolata.  
 -- All leaves with 3-5 pores; caudicles up to 15 cm long, with whorled leaves. 16. S. abchasica.
25. Leaves 7-8 mm long, widely spaced, with upper 1/3 of margins usually smooth. 13. S. scleropoda.  
 -- Leaves 3-4 mm long, crowded, margins aristulate-ciliate. 14. S. sommieri.

Conspectus of the USSR species of Saxifraga, Sect. Porophyllum

Sect. Porophyllum Gaudin, Fl. Helv. 3:84. 1828; Schoenbeck-Temesy in K. H. Rechinger, Fl. Iran. 42:11. 1967. — Sect. Aizoonia Tausch, Hort.Canal. 1: [19] (sine pag., sub "Saxifraga steinmannii"), p.p., excl. typo, "Aizonia". 1823. — Sect. Kabschia Engl., Linnaea 1:14. 1867-1868; Oettingen, Fl. Cauc. Crit. 40:37. 1913.

Type: *Saxifraga caesia* L.

1. *Saxifraga luteo-viridis* Schott & Kotschy, Bot. Zeit. 9:65. 1851; Bordz., Fl. URSS 5:482. 1953; D. A. Webb, Fl. Europ. 1:379. 1964; Czopik, Visokog. fl. Ukrain. Karpat, p. 76. 1976. -- *S. corymbosa* var. *luteo-viridis* (Schott & Kotschy) Engl. & Irmsch., Pflanzenreich 69:540, fig. 110D. 1919.

Type: "in alpium Marmoroszensium alpe petrosa ultra regionem nivalem (Herb. Waldsteinii)" (PR?).

This species, endemic to the Eastern Carpathians, the Transylvanian Alps and the Bulgarian mountains, rarely penetrates the territory of the USSR: the Zanoga and Gnetesa mountains alongside the Soviet-Rumanian border (Czopik, loc. cit.). It grows in the subalpine belt (1400-1600 m) in rock-strewn calcium-rich habitats with southern exposure.

Specimens examined: LE: Ivano-Frankovsk province, Kosovskii region, Chivchinski Range, Mt. Zhupane (upper reaches of the Bolshoi Chernyi Cheremosh River), 27 VI 1964, Czopik. KW: Chivchinski Range, Mt. Gnetesa, eastern spur, 1600 m, 17 VII 1970, Czopik, Ornst & Verenko.

2. *Saxifraga albertii* Regel & Schmalh., Acta Horti Petropol. 5(2):584. 1878; Engl. & Irmsch., Pflanzenreich 69:569. 1919; Losinsk., Fl. SSSR 9:194. tab. 11, fig. 6. 1939; Abdull., Opr. rast. Sr. Az. 4:237. 1974.

Type: "In Turkestanicae montibus Alexander in tractu Karabura, 8,000' alt., 1876, leg. A. Regel" (LE!).

High mountain belts of western Tien Shan (Kirgizski, Talasski Alatau and Chatkalski ranges) and western part of Alai (Alaiski, Turkestanski and Zarafshanski ranges).

Specimens examined: LE: Tian-Shan occid., supra glaciem Ak-Turpak, 12,900', 27 VII 1897, fl., Fedtschenko; ibidem, Maidantal Glacier, 11,500', 29 VII 1897, fl., Fedtschenko; ibidem, Santalash River valley, 13 VIII 1902, veg., Fedtschenko; Talasski Alatau, Aksu-Dzhabagly Nature Preserve, in crevices of almost bare rock between the far reaches of the Dzhesymsai and Kshi-kayandy (alpine belt), 17 VII 1952, fl., Tsvelev; Kirgisia australis, distr. Dzhalalabad, ad rupes marmoreas in regione subnivali montis Baubaschata jugi Ferganici, juxta nives glaciemque, 3200 m.s.m., 16 VIII 1945, veg., Fedorov; ibidem, Karavanski region, southern shore of the Sary-Chilek Lake, Arkit village, 4 IX 1945, Knorring & Pyataeva; N. Abhang des Lasyr Passes zw. Darwas und Roshan nach Jasgolan zu 11,000', 22 IX-4 X 1882, veg., Regel; Seravshan, Voru, 19 VII 1892, veg., Komarov; ibidem, Sabak, 27 VII 1893, veg., Komarov; ibidem, Rovosat Pass, talus by glacier, 19 IX 1931, veg., Nikitin 1837; Turkestanski Range, Mt. Kara-Mulnak (Malyi Andygen), in crevices, 12 VII 1941, veg., Pryakhin.

3. *Saxifraga vvedenskyi* Abdull., Opr. rast. Sr. Az. 4:246 (descr. Lat.), 238. 1974.

Type: Eastern Fergana, Kyzyl-Dzharski region, Karasu River val-

ley, Itokara Canyon, Kulungata brook, 17 IX 1927, fl., M. Sovetkina 1261 (TAK).

An endemic of the Chatkalski Range in the eastern part of Tien Shan. I have not seen any specimens.

4. Saxifraga pseudolaevis Oetting., Acta Horti bot. Univ. Jurjev. 10 (1):15. 1909; Oetting., Fl. Cauc. Crit. 3(5):39. 1915; Losinsk., Fl. SSSR 9:189, tab. 11, fig. 5. 1939; Grossh., Fl. Kavk. ed. 2, 4:282 p.p., tab. 33, fig. 1. (sub "S. laevis"). 1950; Manden., Zam. po sist. i geograf. rast. Tbil. bot. inst. 34:19 p.p. 1977; Galushko, Fl. Sev. Kavk. 2:73. 1980. -- S. laevis subsp. pseudolaevis (Oetting.) Engl. & Irmsh., Pflanzenreich 69:555 p.p., fig. 114C. 1919.

Type: "Iberia (mons Gud), Wilhelms" (LE!).

Endemic to the southern slope of the Great Caucasus; growing in the alpine belt of the Central Caucasus from the Krestovyi Pass in the east to the southern spur of the Elbrus in the west where it penetrates the northern slope at the Boksan headwaters.

The isolated habitat of S. pseudolaevis is indicated on I. Mandenova's map (1977:18) in the easternmost part of the Main Caucasian Range and also on the southern slope. I have never seen these materials and must admit that, judging from the text with its accompanying map, Mandenova considers S. pseudolaevis a species not existing in the Eastern Caucasus.

Specimens examined: LE: Slania, Ingur, 1 VII 1894, veg., Radde; in locis lapidosis prope Kobi, IX, s.a., fl., Hohenacker; Gudaure, 29 VI 1894, fr., Fedtschenko; Kobi, 26 VII 1888, fr., Akinfiev; Devdorak Glacier, 14 VI 1888, fl., Akinfiev; Mt. Gud, 1888, fl., Akinfiev; Lake Kel and Ksanka Pass, 2900 m, 5 VIII 1930, fr., Busch; Lake Kel and Kel Pass, 2950-3100 m, 25 VIII 1933, fr., Busch; ibidem, 18 VII 1936, fl., Busch; talus in Kel Mountains, 3080 m, 21 VII 1937, fl., Kvartskhelia; Middle Ermani Canyon, alpine meadow, 2800 m, 12 VIII 1935, fl., Busch; Upper Ermani Canyon, 2500 m, 1 IX 1935, fr., Busch; Lower Ermani Canyon, 16 VII 1937, veg., Kvartskhelia; Bolshaya Liakhva headwaters, on gravel site, 30 VII 1961, fr., Dolukhanov; in monte Kadlosan (Kakasan), in schistosis (reg. subalpina), 21 VIII 1923, veg., Juzepczuk 495; inter pagg. Vanel et Ruk (Roka), in faucibus fl. Ziakhwa, in rupibus humides, 19 VIII 1923, veg., Woronow & Juzepczuk 376; Uretval Pass, 3200 m, 4 IX 1933, fl., fr., Busch; Roka Pass, alpine meadow on N slope, 2900 m, 24 VII 1929, fr., Busch; Kel volcanic plateau, 2850 m, 4 VII 1924, fl., Dzevanovski 11.

5. Saxifraga blebersteinii Sipl. nom. nov. -- S. laevis Bieb., Fl. Taur.-Cauc. 1:314. 1808, non Haw. 1803; Sternb., Revis. Saxifrag., p. 59. 1810; Ledeb., Fl. Ross. 2:205. 1844; Boiss., Fl. Orient. 2:803. 1870; Oetting., Acta Horti bot. Univ. Jurjev. 10 (1):15. 1909; Oetting., Fl. Cauc. Crit. 3 (5):39. 1915; Losinsk., Fl. SSSR 9:189, tab. 11, fig. 4. 1939; Grossh., Fl. Kavk. ed. 2, 4:280 p.p., excl. icon quod sp. antec. repres. 1950. -- S. meyeri

auct., non Sternb. et non Manden.: Galushko, Fl. Sev. Kavk. 2:73. 1980.

Type: "Crescit in alpihus Caucasieis. Dr. Adams" (LE!).

Adams evidently gathered this authentic material on Mt. Kazbek where he also collected some other Caucasian high-mountain plants, for example, *Saxifraga flagellaris* Willd. ex Sternb. (Adams 1834:-243). In 1801-1803, this was the only place in the alpine belt of the Main Caucasian Range where he could have been while traveling through the Caucasus if one considers the road conditions at that time and the ongoing war between the mountain tribes and the Russians.

The Great Caucasian watershed region is still extremely inaccessible and still studied fragmentarily today. This is how I explain the extreme scarcity of information about this species. I have seen only two samples other than the type (LE!): [Kazbek], Devdorak Glacier, 14 VI 1888, fl., Akinfiiev; in monte Fidar [Fidar-khokh], 21 VIII 1923, fr., Woronow 433.

This species apparently grows farther north and at higher altitudes than *S. pseudolaevis*—below the snowline of the Main Caucasian Range, in the Central Caucasus and possibly only within the borders of the Northern Ossetine.

Dr. Ida Mandenova is correct; if one combines what we call *S. biebersteinii* here with *S. pseudolaevis*, the earlier name will be *S. pseudolaevis* (Mandenova 1977:16). However, I cannot support such a combination. I believe that one must thoroughly study both species before dividing the one into two or joining them. One should not join one species to another or consider the names of two species as synonyms (which often means the same thing) only because there is a lack of data on one of them.

6. *Saxifraga caspica* Sipl., nom. nov. -- *S. meyeri* Manden., Zam. po sist. i geograf. rast. Tbil. bot. inst. 34:18. 1977, non Sternb., 1831. -- *S. laevis* auct., non Bieb.: Oetting., Acta Horti bot. Univ. Jurjev. 10(1):15. 1909. -- *S. laevis* Bieb. var. eulaevis Engl. & Irmsch., Pflanzenreich 69:556, fig. 114D. 1919.

Type: In alpihus Schachdagh, 30 VII 1830, fl., C. A. Meyer 1351 (Enum. Cauc. Casp.) (LE!).

On rocks of the subnival and alpine belts of the eastern part of the Main Caucasian Range; its isolated habitat is also two degrees of latitude farther north in the Andiiski Range (see Mandenova's map, 1977:18). Apparently all habitats of this plant, endemic to eastern Caucasus, are northern and located on the slope of the Main Caucasian Range facing the Caspian Sea. It does not appear on the southern slope but gives way to the aforementioned species there.

Specimens examined: LE: Daghestania: Magi-Dagh, 1874, fl., Becker 1977; Schalbus-Dagh, 1876, fl., Becker 257; ibidem, 1880, fl., Becker 1237; distr. Samur, in fauce inter fl. Daschagie-czai et Gedy-m-czai prope m. Czilim, 9,100-9,900', 14-15 VIII 1900, fl., fr., Alexeenko 14524-5, 14530, 14532-5. Azerbaidzhania: distr.

Kuba, m. Schach-Dagh, in fissuris rupium calcareum, 11,400', 30 VII 1898, fl., Alexeenko 14499, 14541, 14547; Mt. Shakh-Dagh, southern slope, 2,800 m, 26 VIII 1903, veg., Razevich; in rupibus angustiarum supra pagum Sudur, 7,000', 3 VII 1899, veg., Alexeenko 14511; inter m. Mastyrga-Dagh et Kizil-kaja, 5 VII 1929, fl., Sachokia; in pascuis Ashtraf-Eilag, 8 VI 1928, fl., Achverdov; in pascuis alpinis prope pag. Adur, 17 VIII 1930, fl., Kasumov.

According to the labels cited above, S. caspica grows at an elevation of 2,600-3,800 meters. However, Mandenova (1977:18), referring to B. Prima's (1974) research, notes that S. caspica spreads downward along the pebbly banks of rivers to 2,000 meters.

7. Saxifraga polytrichoides Sipl., sp. nov. -- Planta densissime caespitosa surculus caulinis abbreviatis 0.5-2.0 cm longis et ca. 4 mm latis, erectis vel ascendentibus ramosissimis columniformibus dense imbricatim foliatis, pulvinum planum formantibus. Surculorum caulinatorum folia numerosa, infera atrofusca et semiputrifacta, suprema griseo-viridia, apice plus minusve approximata, oblonga, 2-3 mm longa et ca. 0.8 mm lata, supra superne excavata, subtus inferne carinata (medio vix compressa et cochleariformia) toto margine macro grandiciliata (supra medium longius ciliata), apice subaristata, foveolis 1-3 instructa. Caules floriferi ca. 1.5 cm alti, erecti, 2-3-foliati, tenues, parce albo crispo-pilosi, 3-5-flori, pedicellis subglabris; folia caulina duplo longiora, lanceolata, basi petiolatiformi-attenuata, margine ciliata, unifoveolata. Calyx glaber et laevis; sepalia oblonga, 3.5 mm longa et 1.5 mm lata, apice rotundata, submembranacea, ciliata, trinervia, intrinsecus unifoveolata; petala sepalis aequilonga, duplo angustiora, lanceolata, flava, trinervia; stamina sepalis duplo longiora; capsula subglobosa, stylis divergentibus staminibus duplo longioribus.

Typus: Daghestania, distr. Tzumadinensis, jugum Bogossense, ad fontes fl. Kila prope meteostacionem, 8 VIII 1972, defl., T. Popova (LE!).

Affinitas. A S. caspica Sipl. foliis cochleariformibus grandiciliatis duplo-triplo brevioribus et petalis brevioribus trinerviis bene differt.

Omnes specimina examinata in loco classico collecta.

Saxifraga polytrichoides is a sod-forming plant and resembles the moss Polytrichum alpestre Hoppe (= P. strictum Sm.). Only the presence of very conspicuous yellow flowers signals it as a vascular plant. Besides, the S. polytrichoides turf always contains the moss, Distichium capillaceum (Hedw.) B.S.G., which provides an almost complete disguise.

8. Saxifraga subverticillata Boiss., Fl. Orient. 2:803. 1872; Engl. & Irmsch., Pflanzenreich 69:553, fig. 114A. 1919; Oetting., Fl. Cauc. Crit. 3(5):40 p.p. 1915; Losinsk., Fl. SSSR 9:188, tab. 11, fig. 8. 1939; Grossh., Fl. Kavk. ed. 2, 4:280, tab. 32, fig. 12, map 346. 1950; Galuschko, Fl. Sev. Kavk. 2:72. 1980.



Type: Caucasus Orientalis, in spelunca calcar. ad fl. Andaki (Argun), 760 hexap., 14 IX 1860, fr., Ruprecht (LE!).

Endemic to the Great Caucasus, known from the upper reaches of The Malaya Laba River in the west to the source of the Samur River in the east, it grows in the alpine and subnival belts between 2,000-2,500 meters in moist shady and rocky habitats.

Specimens examined: LE: Caucasus Orientalis, Dagestania australis, fl. Samur, infra Kussur, 29 VII 1860, veg., Ruprecht; ibidem, Kaputscha, in rupibus humidis calcareis 10 hexap. supra fl. Beshita, 745-755 hexap., 17 VII 1861, fr., Ruprecht; Inguri, s.a., fr., coll. ignot.; Imeretia, Oni, prope fl. Rion, VII 1877, fr., Brotherus; Fiach-don, 7,500', 25 VII 1894, fr., Akinfiyev; Kutaisi distr., Racha, s.a., fl., Medvedev 133; Georgia, Pshavarskaya Aragva headwater, Noroula Canyon by Shuopkho village, rocks of left bank, 8 IV 1966, fl., Mordak; Caucasian Nature Preserve, Khodnyi Glacier, above snowbed, 12 VIII 1964, fl., fr., Popova.

9. *Saxifraga colchica* Albov, Acta Horti bot. Tifl. 1(suppl. 1): 96. 1895; Engl. & Irmsch., Pflanzenreich 69:555. fig. 114B. 1919; Losinsk., Fl. SSSR 9:189, tab. 11, fig. 9. 1939; Grossh., Fl. Kavk. ed. 2, 4:280, map 346. 1950; Galushko, Fl. Sev. Kavk. 2:72. 1980. -- *S. subverticillata* var. *colchica* (Albov) Oetting., Fl. Cauc. Crit. 3(5):40. 1915.

Type: Mingrelia, ad rupes montis Czita-Gwala, 2,250 m, 4 VII 1893. fl., fr., N. Alboff 345 (LE!).

Endemic to the Main Caucasian Range, spreading along the southern slope of this mountain system within the boundary of western Georgia. However, in the Northern Caucasus it is known only in the outer reaches of the Urushten River (Galushko & Kudryashova 1967:170). On rocks of the alpine belt.

Specimens examined: LE: Dolomis-Tsvari, 9,000', VIII, s.a., fr., coll. ignot. 58; Chernomorski province, Kardatacha Lake, 6 VIII 1895, fr., Lipski; Gvarabi, 2,200 m, 6 VIII 1933, fr., Kolkovski 2519.

10. *Saxifraga caucasica* Somm. & Levier, Acta Horti Petropol. 13(2):188. 1894; idem, loc. cit. 16:168, tab. 17. 1900; Oetting., Fl. Cauc. Crit. 3(5):37. 1915; Losinsk., Fl. SSSR 9:191. 1939; Grossh., Fl. Kavk. ed. 2, 4:282, tab. 33, fig. 4, map 321. 1950; Galushko, Fl. Sev. Kavk. 2:72, fig. 13d. 1980.— *S. caucasica* var. *levieri* Engl. & Irmsch., Pflanzenreich 69:552, fig. 113G,H. 1919.

Type: In jugo Teberdinski pereval dicto, inter flumina Tieberda et Daut, ditiones Kuban, supra jugum 2,800-3,000 m, 2 IX 1890, S. Sommer et E. Levier 494 (LE!).

Endemic to the Great Caucasus, extending to the outer reaches of the Kuban River, along the Teberda and Uchup, that is, between the Klukhorski and Bogosski passes and on Mt. Elbrus. It grows on rocks of the alpine belt between 2,300 and 3,400 meters.

Specimens examined: LE: Bogoski Pass, northern slope, 11,000', s.a., fl., Akinfiyev; Mt. Elbrus, Rtsyvashki Glacier, 29 VII 1893, fl., Lipski; Maruk, Svany, 2,300 m, 21 VIII 1933, fr., Kolakovski 2522.

11. Saxifraga sosnowskyi Manden., Zam. po sist. i geograf. rast. Tbil. bot. Inst. 19:10. 1956. — S. caucasica auct. non Somm. & Levier: Manden., Fl. Georg. 4:385 p.p. 1948.

Type: Georgia, Kartalinia, Tskhra-Tskaro Range, rocks, 15 VII 1916, fl., Kozlovski (TBI).

Along ledges and crevices of rocks in the alpine belt of the Small Caucasus, such as Kartalinia and Meskhetia in Georgia. It has been observed in the Mts. Ardzhevan, Sanisio, Kodiani, Dzham-Dzham and Tisseli. In the Small Caucasus it replaces the closely related C. caucasica, which is found only in the Great Caucasus.

12. Saxifraga desoulavyi Oetting., Acta Horti Bot. Univ. Jurj. 10:16. 1910; Oetting., Fl. Cauc. Crit. 3(5):47. 1915; Losinsk., Fl. SSSR 9:190 p.p. 1939; Grossh., Fl. Kavk. ed. 2, 4:282, map 324. 1950; Galushko, Fl. Sev. Kavk. 2:73. 1980.—S. caucasica var. desoulavyi (Oetting.) Engl. & Irmsch., Pflanzenreich 69:553, fig. 113H. 1919.

Type: "Habitat in Caucaso Magno Centrali, Balkaria, Shtulu, 7,000', s.a., Desoulavy" (TU).

This endemic species was known for a long time only in its classic habitat, Mt. Shtulu, on the border between Kabardino-Balkaria and Georgia. At the present time it is known from Northern Ossetia as well, where it grows in moraines and gravelly places about 2,500 meters (Galushko & Kudryashova 1967:172).

13. Saxifraga scleropoda Somm. & Levier, Acta Horti Petropol. 13(2):186. 1894; Somm. & Levier, loc. cit. 16:170, tab. 18, fig. 1-5. 1900. Oetting., Fl. Cauc. crit. 3(5):45 p.p. 1915; Engl. & Irmsch., Pflanzenreich 69:556 p.p. 1919; Losinsk., Fl. SSSR 9:190 p.p. 1939; Grossh., Fl. Kavk. ed. 2, 4:282, tab. 33, fig. 2, map 348 p.p. 1950; Galushko, Fl. Sev. Kavk. 2:73, fig. 13h. 1980.

Type: Kuban, in alta valle Tieberda, ad rupes, 1,550 m, 31 VIII 1890, Sommier & Levier 496 (LE!).

Endemic to the Main Caucasian Range, extending from Mt. Fisht-Oshten in the west to the Chegem River in the east; more common on the northern slope of the range. On rocks, scree and moraines of the alpine belt between 1,800 m (Peredovoi Range, Urup River) and 3,500 m (Syltrek Lake), but most often at about 2,400 m in stony, calcium-rich sites.

14. Saxifraga sommieri (Engl. & Irmsch.) Sipl., comb. nov. S. scleropoda var. sommieri Engl. & Irmsch., Pflanzenreich 69:557. 1919. S. scleropoda var. nivalis Somm. & Levier, Acta Horti Petropol. 13(2):187. 1894; Somm. & Levier, loc. cit. 16:171, tab. 18, fig. 6, 7. 1900; Oetting., Fl. Cauc. Crit. 3(5):46 p.p. 1915; Grossh., Fl. Kavk. ed. 2, 4:282, map 348 p.p. 1950.

Type: Abchasia, in alpinis supra jug. Kluchor, 2,700-2,800 m, 28 VIII 1890, S. Sommer et E. Levier 196 (LE!).

Endemic to the central and western parts of the Great Caucasus.

Specimens examined: LE: Mt. Elbrus, in alpinis locis lapidosis s.a. (Herb. Meyer); Mt. Elbrus, Malka Glacier, 14 VII 1892, fr., Lipski; Balkaria, alpine meadow on the top of Mt. Likhtygen, 2,900 m, 30 VIII 1927, veg., Busch 78; Utkul Glacier, 1890, fr., Lipski; moraine of the Tsei Glacier, 27 VII 1891, veg., Akinfiev; moraines of the Donguzorun Glacier, 8,500-9,000', 17 VII 1897, fr., Akinfiev; ibidem, VII 1913, fl., fr., Busch; moraine of the Bashil Glacier, 7,000-7,200', 1 VIII 1913, fl., Busch 92; mountain steppe Syltrak, on rocks, 5,000-6,000', 26 VI 1911, Busch 56; moraines of the Bezenchi Glacier across from Ullu-Tulluku, 8,500', 10 VII 1913, fr., Busch; Teberda headwaters, on rocks, 9,000-11,000', 18 VI 1899, fl., Desoulavy; Caucasian Nature Preserve, Mt. Khuko, southern slope along Shakhe River, subalpine meadow, 13 V 1973, fl., Sergeenko.

15. *Saxifraga unifoveolata* Sipl. sp. nov. Planta radice lignosa, densissime caespitosa, surculis caulinis 1-3 cm longis et 3-5 mm crassis dense imbricatisque foliatis columnariformibus. Folia surculorum caulinarum minima, 2.2-3.0 mm longa et ca. 0.75 mm lata, oblongo-ovata, supra medium latiora, griseo-viridia, margine ciliata, apice mucronulata et marginata, tantum una foveola apicali instructa; folia caulina lanceolata, duplo longiora, margine flexuoso-ciliata. Caules floriferi 2-4 cm. alti, laxi foliati, albido-crispo-pilosi; flores 5-9. Calyx basi rotundatus, subglaber; sepala ca. 1.75 mm longa, oblonga, apice rotundata, trinervia, glabra, margine submembranacea, serrulato-ciliata. Petala lanceolata, flava, basin versus linearia, uninervia, sepalis subduplo longiora. Capsula fusca, ca. 2.5 mm longa, rotundato-ovata, stylis divergentibus; semina ca. 0.2 mm longa, atropurea, elliptica.

Typus: Reservatum publicum Caucasicum, in rupibus declivis orientalis montis Oshten, 9 VII 1955, L. Vassiljeva (LE!).

Affinitas. A *S. scleropoda* Somm. & Levier foliis parvis unifoveolatis bene differt. A habitu simillima *S. ruprechtiana* Manden. foliis apice abrupte angustatis et subtus non carinatis (non sensim acutatis et subtus carinatis) differt.

Paratypi: LE: Kuban, Mt. Tkhach, subalpine meadow, 6,500', 8 VII 1906, fr., Klopotov; Bolshoi Bombak (Parnygu), alpine belt, 9,000', on rock in the place "Georgievski gai", 16 VII 1906, fr., Klopotov; Kishi (Chegea) headwaters, glacial moraine, 8,000', 4 VIII 1906, veg., Klopotov; Bolshaya Markhi western headwater, alpine belt, 2 IX 1907, Busch 801; Terek distr., Kuliak Glacier moraine, 7,700-8,000', 7 VIII 1913, fr., Busch 91; Cherkesia, southern slope of Mt. Fisht, on stones, 6 IX 1927, fr., Woronow & Steup; rocks on the northern slope of Mt. Chuba, 10 VII 1929, fr., Leskov & Rusalev 318; Peredovoi Range, Urup River, on the summit of Mt. Augazy by geodetic mark, on rocks, 2,521 m, 17 VIII 1945,

veg., Grubov.

16. Saxifraga abchasica Oetting., Acta Horti Bot. Univ. Jurjev. 8:97. 1908; Oetting., Fl. Cauc. Crit. 3(5):45. 1915; Losinsk., Fl. SSSR 9:191, tab. 11, fig. 3. 1939; Grossh., Fl. Kavk., ed. 2, 4:282, tab. 33, fig. 3, map 330. 1950. S. scleropoda var. abchasica (Oetting.) Engl. & Irmsch., Pflanzenreich 69:557, fig. 114F. 1919.

Type: West Transcaucasia, Abchasia, Gagra Mountains, Mt. Shmek, limestone rocks on the southern slope, 7,600', 1 VIII 1905, fl., fr., Woronow 258 (LE!).

Described as endemic to the Abkhasian Mountains where the author who described this species believed S. scleropoda to be absent. This supposition has not been supported subsequently. Typical S. scleropoda grows in Abkhasia and a plant conforming to the type of S. abchasica can be found beyond the Abkhasia border. Both species, in spite of some similarities and partially overlapping areas of distribution, are completely independent of one another. S. abchasica grows on rocks in the alpine and subalpine belts 2,000 and 2,700 meters.

Specimens examined. LE: Ossetine, Kariu-khokh, on north and south slopes, 7 VI 1890, fr.; Kuznetsow 555; Ulukash, 7,000-8,000', 4 VI 1892, fl., Akinfiiev; Bzybski Range, on rocks, 7,000-8,000', veg., Albov.

17. Saxifraga juniperifolia Adams in Web. & Mohr, Beitr. Naturk. 1:53. 1805; Oetting., Fl. Cauc. Crit. 3(5):42 p.p. 1915; Engl. & Irmsch., Pflanzenreich 69:549 p.p., fig. 113A. 1919; Losinsk., Fl. SSSR 9:188, tab. 11, fig. 7 p.p. 1939; Grossh., Fl. Kavk., ed. 2, 4:279, tab. 32, fig. 11, map 345 p.p. 1950; Galushko, Fl. Sev. Kavk. 2:73. 1980. -- S. juniperina Bieb., Fl. Taur.-Cauc. 1:314, 427. 1808; Bieb., loc. cit. 3:291. 1819; Sternb., Revis. Saxifr. p. 31, tab. 10. 1810; Boiss., Fl. Orient. 2:804. 1872.

Type: "Ex Caucaso Iberico. Comm. Schlegelmilch. Adam."(LE!). On rocks in the subalpine and alpine belts both in sun and shade, often extending downward below the forest belt to 1,460 (Kazbegi) -1,800 (Andi in Dagestan) meters (Galushko & Kudryashova, 1967 p. 171). It extends upward to 3,200 meters on Mt. Bazar in Dagestan. In the Great Caucasus it spreads from the outer reaches of the Podkumok River in the Skalistyi Range and Mt. Elbrus in the west to the outer reaches of the Samur River in the east. Farther south, isolated stands of this species may be encountered in Armenia in the Shishkaya, Dzhan-Akhmet and Kapudzhukh Mountains, and in Turkey in the Pont Mountains in the Chorokh River Basin.

18. Saxifraga grisea Sipl., sp. nov. S. juniperifolia Adams var. cinerea Oetting., Fl. Cauc. crit. 3(5):43. 1915 (non S. cinerea H. Smith, Bull. Brit. Mus. [Nat. Hist.] Bot. 2:128. 1958);

Engl. & Irmsch., *Pflanzenreich* 69:552, fig. 113E. 1919; Grossh., *Fl. Kavk.* ed. 2, 4:280. 1950.

Type: Caucasus, Ossetine, on the rocks in Alagir Canyon, 10 VI 1900, fl., V. Markovich (LE!).

Endemic to the Mt. Kazbek region of the Caucasus, on rocks in the wooded, partially subalpine belts from about 850 to 2,300 meters. Most often, however, it is found at about 1,700 meters in conifer forests.

19. *Saxifraga kuznezowiana* Oettingen, *Acta Horti Bot. Univ. Jurjev.* 10:15. 1910; Oetting., *Fl. Cauc. Crit.* 3(5):42, "kuznezowii". 1915; Losinsk., *Fl. SSSR* 9:192. 1939; Grossh., *Fl. Kavk.* ed. 2, 4:283, map 326. 1950; Galushko, *Fl. Sev. Kavk.* 2:72. 1980. — *S. juniperifolia* var. *kuznezowiana* (Oetting.) Engl. & Irmsch., *Pflanzenreich* 69:552. 1919.

Type: "Habitat in Caucaso Magni Centrali trajecti Mamisson, VII 1897, Desoulavy" (ubi?).

Endemic to the Central Caucasus, known until now only as first described. The type specimen location has not been established. Judging from Oettingen's diagnosis, this species is clearly related to what is known at the present time as *Saxifraga charadzeae* Otschiauri and, although there are some very essential differences between them, it seems entirely plausible that both species are described from two ends of a small area of some rare ecological race of *S. juniperifolia* sens. lat. with dilated five-nerved petals. It cannot be excluded that subsequent research may provide evidence justifying the union of these taxa.

20. *Saxifraga charadzeae* Otschiauri, *Zam. po sist. i geograf. Tbil. bot. inst.* 23:68, fig. 1. 1963; Galushko, *Fl. Sev. Kavk.* 2:73, fig. 13e. 1980.

Type: Northern Caucasus, Assu River Canyon, Tsei-Lam Range, on limestone in subalpine belt, 11 V 1959, fl., D. Ochiauri & K. Kimeridze (TSM).

Endemic to the eastern part of the Northern Caucasus. Until now it has been found only in two areas: the Tsei-Lam Mountains in Northeastern Georgia (the Assu River basin) where it grows in tufts on limestone deposits near timberline, mostly on northern slopes and in the Andiiski Range in Dagestan. Possibly it is simply a form of the last species.

Specimens examined: LE: Dagestan, Andi village, left bank of the river, 19 VI 1964, fl., Popova.

21. *Saxifraga ruprechtiana* Mandenova, *Zam. po sist. i geograf. rast. Tbil. bot. inst.* 19:12. 1956; Galushko, *Fl. Sev. Kavk.* 2:73, fig. 13g. 1980. — *S. juniperina* delta *brachyphylla* Boiss., *Fl. Orient.* 2:804. 1872. *S. juniperifolia* var. *imbricata* Rupr. ex Oetting., *Fl. Cauc. Crit.* 3(5):44 p.p. 1915. *S. juniperifolia* var. *brachyphylla* (Boiss.) Engl. & Irmsch., *Pflanzenreich* 69:551, fig. 113D. 1919.

Type: Caucasus Orientalis, Tuschetia, pr. Diklo, in m. Sadisch, 1,750-1.730 hexap., 2 VIII 1861, fr., Ruprecht (LE!).

Endemic to the central and eastern parts of the Great Caucasus, this species is infrequently encountered on limestone rocks in the subnival belt from 2,200 meters and higher in eastern Georgia, in Mingrelia, Khevsuria and Tushetia, in Kabardino-Balkaria, Ossetine and Dagestan (Bogoski Range).

Specimens examined: LE: Mingrelia: limestone rocks by the brinks of the Askhi Plateau, 6,800', 1 VII 1911, fl., Shelkovnikov. Balkaria: Suuk-Auzkaya, Cave Canyon, 2,450 m, 16 VI 1927, fl., Busch; Ogary-Erkhy talus, alpine meadow on NE slope, 2,900-3,000 m, 16 VI 1927, fl., Busch; Turetle, 2,400 m. 30 VI 1927, fl., fr., Busch; Cherek Besengiiski headwater, 1 VI 1969, fl., Menitski.

22. Saxifraga columnaris Schmalhausen, Ber. Deutsch. Bot. Ges. 10:288, tab. 17, fig. 8-12. 1892; Schmalh., Bull. Soc. Geogr. Cauc. 1:186, tab. 17, fig. 8-18. 1892; Oetting., Fl. Cauc. Crit. 3(5):48. 1915; Losinsk., Fl. SSSR 9:194, tab. 11, fig. 1. 1939; Grossh., Fl. Kavk. ed. 2, 4:283, tab. 33, fig. 5, map 349. 1950; Galushko, Fl. Sev. Kavk. 2:70, fig. 13a. 1980.

Type: Balkaria in Northern Caucasus, Psekan-Su, 15 VII 1891, fl., fr., Akinfiev (LE!).

Endemic to the Skalistyi Range of the Central Caucasus, growing on dolomite rocks in the middle and upper belts from the Malka River in the west to Mt. Skalistaya in the east (Galushko, loc. cit.).

Specimens examined: LE: Northern Ossetine: Curtathia, Fiach-Don, 7,000', 26 VII 1894, veg., Akinfiev. Balkaria: Sukan-Su, 6,000', 16 VII 1896, veg., coll. ignot.; Suuk-Auz, Kara-Su River at Suuk-Auz-tar, rocks, 2,250 m, 19 VI 1927, fl., Busch; Skalistyi Range, Gizhgut, Bichenchu Pass, 3 IX 1964, veg., Popova; ibidem, 1 VI 1965, fl., Popova; Khulamski Cherek River Canyon, Kara-Su village, in crevices of sheer limestone rocks (often hanging down, festoon-fashion, according to the collector's note), 11 V 1968, veg., Kharkevich.

23. Saxifraga dinnikii Schmalhausen, Ber. Deutsch. Bot. Ges. 10:288, tab. 17, fig. 6, 7. 1892; Oetting., Fl. Cauc. Crit. 3(5):-48. 1915; Engl. & Irmsch., Pflanzenreich 69:571. 1919; Losinsk., Fl. SSSR 9:197, tab. 11, fig. 2. 1939; Grossh., Fl. Kavk. ed. 2, 4:283, map 350. 1950; Galushko & Kudryashova, Novitates sist. (Leningrad) 2:126-129 (icon descriptioque optima). 1965; Galushko, Fl. Sev. Kavk. 2:72, fig. 13c. 1980.

Type: Balkaria, Psekan-Su, 15 VII 1891, fr., I. Akinfiev (LE!)

Endemic to the central part of the Great Caucasus, confined to dolomite deposits of the Skalistyi Range in Kabardino-Balkaria, from Chegem to Khynzy-Su, collections being made especially often along the Cherek Bezengiiski and Kara-Su Bezengiiski rivers.

Specimens examined: LE: Balkaria: Kizil-kaya rocks by Khulam Pass, 10,000', 27 VII 1893, fl., Lipski; Khulamvtsek, 27 VII 1893, fr., Lipski; Suuk-Auz, 2600 m, 22 VI 1925, fr., Busch; Suuk-Auz-tar, rocks, 2,250 m, 19 VI 1927, fr., Busch; ibidem, Cove Canyon, 2,400 m, 17 VI 1927, fr., Busch; Skalistyi Range, Sukan-Su River canyon, on rocks, 29 IV 1962, fl., Galushko & Kudryashova; ibidem, Gizhigit to Bechenchu Pass, 3 IX 1964, veg., Popova; Khulamski Cherek Creek canyon, Kara-Su village, on wet limestone rocks, frequent, 11 V 1968, defl., Kharkevich.

24. *Saxifraga* X oettingenii Galushko & Kudryashova, Der. Kust. Sev. Kavk. p. 176. 1967; Galushko, Fl. Sev. Kavk. 2:72. 1980. S. X akinfieyii Galushko & Kudryashova, loc. cit., p. 173; Galushko, loc. cit. 2:72.

Type: Caucaso Borealis, Balkaria, ad fl. Sukan-Su, in rupibus jugi Skalistyi, 3 V 1962, A. Galushko & G. Kudryashova (ubi?).

I was not able to find the types of S. X oettingenii or S. X akinfieyii, although the authors of both of these species designated the location of the holotypes as "(LE)", the Botanical Institute in Leningrad. They cannot be found there, and, as far as I can ascertain, never were deposited there.

Endemic to the Skalistyi Range of the Central Caucasus, and known only from the type locality on the dolomite rocks of the middle belt. It represents the hybrid, Saxifraga dinnikii X S. juniperifolia. It differs from the former in its peduncles, only rarely single-flowered (usually with 2-5 flowers), and from the latter in its multi- (more than five-) nerved petals which are longer than the stamens. The color of the petals varies from pale yellow to various shades of rosy yellow grading to orange.

25. *Saxifraga* carinata Oettingen, Acta Horti Bot. Univ. Jurjev. 8:96. 1908; Oetting., Fl. Cauc. Crit. 3(5):47. 1915; Losinsk., Fl. SSSR 9:193. 1939; Grossh., Fl. Kavk. ed. 2, 4:283, map 316. 1950; Galushko, Fl. Sev. Kavk. 2:70, fig. 13b. 1980.

Type: "Hab. in Caucaso medio (Balkaria), in rupibus montis Schutulu, 9,000', VII 1901, defl., Desoulavy" (TU).

An endemic of the Central Caucasus, known only from the upper reaches of the Cherek Balkarski River, where it is extremely abundant in the place "Polyana Shtulu", forming thick cushions of yellow flowers (Galushko & Kudryashova 1967:175).

26. *Saxifraga* pulvinaria H. Smith, Bull. Brit. Mus. (Nat. Hist.), Bot. (2) 4:105, fig. 4m-o. 1958; Ikonnikov, Opr. rast. Pamira, p. 149. 1963; Schoenbeck-Temesy, in K. H. Rechinger, Fl. Iran. 42:13. 1967; Abdull, Opr. rast. Sr. Az. 4:237. 1974. S. imbricata Royle, Ill. Fl. Himal. Mount. p. 226, tab. 49, fig. 1. 1835, non Lam. 1778; Engl. & Irmsch., Pflanzenreich 69:573, fig. 120 ("drawings are partly incorrect" -- H. Smith, loc. cit.). 1919.

Type: Kumawur ["the type... was collected in Kunawar, Simla Hill States....As the Royle collections are not available, the type cannot be examined" -- H. Smith, loc. cit.], Isotype (LE!). I was very fortunate to find isotypes of this species in the herbarium of the Botanical Institute in Leningrad.

A Himalayan-Hindu Kush high-mountain species occurring in Afghanistan, India and Pakistan in a belt of cushion-like vegetation at an altitude of 3,800-5,850 meters, S. pulvinaria barely penetrates USSR territory in Eastern Pamir (the Ak-Tash Mountains). Its characteristic cushions are found on the pebbly slopes of the cold high-mountain desert.

Specimens examined: LE: Eastern Pamir, Shindy-Sai, Ak-Tash Mts., in limestone crevices, 4,800 m, 9 IX 1947, Stanyukovich; Ak-Tash Mts., rocks on eastern slope, 4,300 m, 21 VII 1953, fl., Ikonnikov 3a.

#### Geographical Distribution

The Saxifraga species of the Porophyllum section are unevenly distributed throughout the Soviet territory in the following three widely-separated regions: the Carpathians, the Caucasus and Middle Asia.

The only species of the Eastern (or Ukrainian) Carpathians--Saxifraga luteo-viridis, is, strictly speaking, absent in this region. It is listed here only because the Soviet-Rumanian border happens to pass across two mountaintops along the extreme north-western border of distribution of this Southern Carpathian species.

The situation is similar with S. pulvinaria, a Himalayan plant which barely enters the Soviet part of the Pamir. Only S. albertii and its close relative, S. vvedenskyi, can in all fairness be described as representatives of the section in the vast plateaus of the Tien Shan and the Pamiro-Alai. If we take into account the fact that the Hindu Kush Range and the Kashmir Mountains bring the above-mentioned mountain systems into one orographical whole with the Himalaya (with their 40 species of this section), the sparseness of the Middle Asian Saxifraga is a phytogeographical enigma, just like the absence of the genus Rhododendron in the mountains of Middle Asia even though it abounds in the Himalaya.

But it is not only the Tien Shan and the Pamiro-Alai that are poor in species of the Porophyllum section. Comparable in their size and altitude the Iran mountains of Elburz and Zagrossa, the Pont Mountains and the numerous ranges of Turkish Armenia have one or two species of the section, if any (Schoenbeck-Temesy 1967; Matthews 1972). Therefore, the presence of 22 species of this section in the Caucasus is, in itself, a phytogeographic phenomenon which makes it possible to regard this mountain region as an isolated center of species-generation, a center that is less significant (judging solely by the total number of species) than the



Himalaya but quite comparable with mountains of Central and Southern Europe (18 species, according to Webb, 1964).

This isolation becomes more pointed if we take into account the fact that only one species, *S. juniperifolia*, is distributed along the Great as well as the Small Caucasus and penetrates Turkish territory. And only one species, *S. sosnovskyi*, is endemic to the Small Caucasus. The remaining 20 species are endemic to the Great Caucasus.

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